

ENR 1.5 DEPARTURE, HOLDING, AND APPROACH PROCEDURES

1 GENERAL

1.1 Use of PANS-OPS

1.1.1 Instrument holding, approach, and departure procedures in New Zealand are designed using criteria contained in ICAO Doc 8168 — PANS-OPS VOL II.

1.1.2 PANS-OPS stresses the need for flight crew and operational personnel to adhere strictly to the published procedures in order to achieve and maintain an acceptable level of safety in operations.

1.2 Significant Differences from ICAO Doc 8168 — PANS-OPS

Non-Standard Approach Procedures

1.2.1 At a limited number of locations in New Zealand, the terrain or existing NAVAID infrastructure necessitated promulgation of instrument approach procedures which are primarily designed to enable the flight crew to establish the visual references necessary to continue on a visual approach, or to proceed to the aerodrome of landing under VFR, as applicable.

1.2.2 Although the minima for these approaches are annotated on AIP charts as “circling”, these approaches do not utilise the standard circling areas or standard circling manoeuvring. These approaches are distinguished from standard PANS-OPS circling approaches by a note below the landing minima box on the approach chart stating the intent.

These approaches are:

- Great Barrier (NZGB): RNP B
- Queenstown (NZQN): VOR/DME B, VOR/DME C, RNP F, RNP G, RNP H
- Okiwi Station (NZOX): RNP A
- Kaikoura (NZKI): NDB A
- Whitianga (NZWT): RNP A
- Ruatoria (NZRR): RNP A

1.3 Containment Within Controlled Airspace

1.3.1 Controlled airspace may not totally contain the navigational tolerances associated with holding, approach, and departure procedures at controlled aerodromes.

1.3.2 Airspace is designed to contain arrivals based on a 5% descent gradient. When higher gradients are required, altitude constraints will be published to ensure airspace containment.

1.3.3 Airspace containment for approaches is based on the approach gradient or 5% where there is no stated gradient.

1.3.4 Minimum altitudes specified on DME ARCs and holding procedures provide terrain and obstacle clearance, but do not ensure flight is contained within controlled airspace.

1.3.5 Published minimum climb gradients (PDG) on instrument departures provide required obstacle clearance but do not ensure controlled airspace containment.

1.3.6 For departure procedures at Auckland, Wellington and Christchurch an advisory climb gradient for controlled airspace containment will be stated where this is higher than the obstacle clearance gradient.

1.3.7 Where controlled airspace containment has been assessed for a departure procedure at an aerodrome other than Auckland, Wellington or Christchurch, it will only include an advisory climb gradient where a climb gradient higher than 5% is required, as a 5% climb gradient is used to evaluate airspace containment requirements.

1.3.8 Published minimum climb gradients on a dedicated Radar SID will ensure both required obstacle clearance and containment within controlled airspace until the commencement of radar vectoring. During radar vectoring, controlled airspace containment and adequate obstacle clearance will be ensured by radar controller.

1.3.9 For a missed approach procedure, airspace containment is based on the assumption that a 5% climb gradient can be achieved and maintained. If the altitude given in the missed approach instructions cannot be reached, aircraft are to climb in the hold and at controlled aerodromes, the pilot is to advise ATC.

1.4 Performance Based Navigation (PBN)

1.4.1 The following ICAO PBN specifications have been implemented in New Zealand FIR (NZZC) in accordance with ICAO Doc 9613 — PBN Manual:

- (a) RNAV 1 specification for STAR at Auckland, Whenuapai, Wellington and Christchurch;
- (b) RNAV 2 specification for all RNAV enroute operations;
- (c) RNP 1 specification for SID and STAR at selected regional aerodromes;
- (d) RNP 2 specification for RNP enroute operations at selected locations; and
- (e) RNP Approach (RNP APCH) specification at selected aerodromes. This applies to approaches titled RNP; and
- (f) RNP Authorisation Required (RNP AR) specification at selected aerodromes. This applies to approaches titled RNP (AR).

Note: RNP (AR) approach and departure procedures at Queenstown Aerodrome (NZQN) are not designed in accordance with ICAO RNP AR specification.

1.4.2 The following navigation systems are supporting PBN applications in NZZC:

- (a) GNSS navigation systems — all PBN specifications.
- (b) FMS with DME/DME/IRU sensor inputs — RNAV 1 SID and STAR unless otherwise stated on chart, and selected RNAV 2 routes.

Note: Refer to ENR Table 3.2-1 for the list of RNAV 2 ATS routes available to DME/DME/IRU equipped aircraft.

1.4.3 Navigation systems with DME/DME sensor inputs only, do not support PBN application in NZZC unless otherwise stated on chart.

1.4.4 All pilots are required to maintain route centrelines, as depicted by on-board lateral deviation indicators and/or flight guidance, unless authorised to deviate by ATC or under emergency conditions.

1.4.5 For normal operations, cross-track error/deviation (the difference between the RNAV system-computed path and the aircraft position relative to the path) should be limited to $\pm \frac{1}{2}$ the navigation accuracy associated with the procedure or route (e.g. for RNP 1, maximum deviation is 0.5 NM). Brief deviations from this standard during and immediately after procedure/route turns, up to a maximum of one-times the navigation accuracy (i.e. 1 NM for RNP 1), are allowable.

1.4.6 CAA Operator approval is required for most PBN operations within NZCC. CAA Advisory Circular AC 91-21 details the requirements for all operators for an operational approval to conduct PBN operations. AC 91-21 is available at CAA web site www.caa.govt.nz.

1.4.7 Aircraft with existing GPS IFR Terminal Approvals and fitted with equipment listed in AC91-21 'Table — FAA AC 90-100A Non-Compliant Equipment' cannot fly RNAV 1 procedures.

1.5 ATC Speed and Altitude Constraints

1.5.1 Speed and altitude constraints required for air traffic management that are incorporated into instrument flight procedures will be preceded by the symbol '✕'. This differentiates ATC restrictions from those constraints that are inherent in the design of the instrument flight procedure. Each element will be annotated separately. These ATC restrictions may be amended or cancelled by ATC in accordance with their procedures.

1.5.2 The annotated ATC restrictions can be seen on those applicable instrument procedure charts that have been reissued, or new charts issued, from 26 MAY 16.

2 DEPARTING FLIGHTS

2.1 IFR Departure Procedures

2.1.1 Published departure procedures provide routing to avoid most high terrain that may be in relatively close proximity to the aerodrome. Where this is not possible minimum set heading altitudes or visual segments will be prescribed. In emergency circumstances terrain clearance cannot be guaranteed under all conditions of operation, due to aircraft performance.

2.1.2 In accordance with PANS-OPS, Vol II, the promulgated departure procedure design gradient may not take into account close-in obstacles with height of 60 m (200 ft) or less above departure end of runway (DER). At locations where such obstacles exist, a 'cautionary' note, including obstacle position and height, is provided as part of the departure instructions.

2.1.3 The pilot must consider the one engine inoperative climb performance of the aircraft in relation to the height of terrain over which the climb is planned. Where adequate terrain clearance in IMC cannot be ensured the pilot must establish before departure that, in the event of engine failure prior to reaching MSA, or the level acceleration altitude, adequate action can be taken to protect the aircraft. This action will normally involve a return towards the departure aid until either MSA is reached or approval is granted to re-join for approach and landing; in this respect the pilot must take into consideration the terrain over which a reversal turn may have to be completed.

2.1.4 Departure procedures may consist of one or more of the following:

- (a) a published instrument departure procedure;
- (b) a climb on track above enroute descent (distance) or VORSEC chart steps, when each designated step is to be crossed at an altitude of at least the next step minimum altitude;
- (c) a specified track, radar heading or radar SID or heading within an evaluated climb sector;
- (d) departure instructions containing an initial altitude restriction when radar control is being exercised. Pilots can expect to receive an amended clearance to climb when clear of conflicting traffic;
- (e) a visual departure by day only, having due regard to prevailing MET conditions, a departure maintaining terrain clearance visually to applicable MSA (including enroute descent (distance), VORSEC chart steps or PBN SID segment MSA) or specified upper limit or set heading point or altitude. Set heading and minimum crossing altitudes are based on a MNM net climb gradient of 3.3% unless higher stated while maintaining enroute clearances.
- (f) departure instructions containing a visual departure segment may be flown only during the day.

A procedure containing a visual departure segment may be considered for application at night following a separate aeronautical study by CAA as the ATS authority.

Note: Departure procedures with a visual departure segment approved to be flown at night will be so annotated on the respective chart.

2.1.5 If a secondary or grass runway with a promulgated IFR take-off minimum is not included in the departure procedure for an aerodrome, the pilot may take-off from that runway by day only provided:

- (a) the pilot maintains terrain clearance visually until established on a promulgated departure procedure for that aerodrome; and
- (b) the aircraft maintains an adequate climb gradient to ensure obstacle clearance.

2.1.6 Aircraft are to intercept the specified departure track by the shortest practical means after completing the turn after take-off. The direction of turn is as published or as instructed by ATC.

2.1.7 Where climb to a minimum altitude is required in the departure procedure, ATC may require a climb to a higher altitude for traffic management, provided mandatory climb and turn requirements are not compromised.

2.1.8 Aircraft on a visual departure may be required to route via prominent geographical features, landmarks, visual reporting points or CTA/CTR sectors in order to achieve geographical separation. Visual Navigation Charts or an electronic equivalent should be carried.

2.1.9 Where no published instrument departure procedure is promulgated for a route, the pilot is to ensure that, when flying the other departure options available as in para 2.1.4, the climb performance of the aircraft is adequate to provide obstacle clearance prior to reaching minimum safe altitude.

2.1.10 A rate of climb table is provided in Table ENR 1.5-1 to assist pilots in assessing and monitoring climb requirements under known or approximate groundspeed conditions.

Climb in Evaluated Climb Sector

2.1.11 Departure instructions from ATC or the departure procedure flown by a pilot may include a specific track or heading within an evaluated climb sector, which may be within a sector limited by radials and/or tracks, or omni-directional.

2.1.12 Unless otherwise specified aircraft are to:

- (a) maintain from take-off the climb gradient as required by the departure procedure for the track being flown; and
- (b) climb on departure to MNM 400 ft (or higher altitude if specified) above aerodrome level before commencing a turn to intercept track or heading.

2.1.13 Where an aircraft is required to cross through two or more sectors to intercept the departure track, the higher climb gradient required applies from take-off.

2.1.14 Where a departure requires an aircraft to climb via the radial or track dividing two sectors with different climb gradients, one of which may be the standard 3.3% climb sector, aircraft need only comply with the lower sector gradient required.

2.1.15 Prior to leaving an evaluated climb sector the aircraft must be:

- (a) established on an evaluated route; or
- (b) established on a climb above VORSEC steps; or
- (c) established under radar control at or above minimum radar terrain contour level; or
- (d) at or above an approved area MSA.

**Table ENR 1.5-1
Instrument Take-Off Procedure — Rate of Climb**

This rate of climb table is provided for use in planning and executing take-off procedures under known or approximate groundspeed conditions.

Gradient percent %	GROUND SPEED (KNOTS)													ft/NM
	30	60	80	90	100	120	140	150	180	210	240	270	300	
3.3%	100	200	267	300	333	400	467	500	600	700	800	900	1000	200
4.1%	125	250	333	375	417	500	583	625	750	875	1000	1125	1250	250
4.9%	150	300	400	450	500	600	700	750	900	1050	1200	1350	1500	300
5.8%	175	350	467	525	583	700	816	875	1050	1225	1400	1575	1750	350
6.6%	200	400	533	600	667	800	933	1000	1200	1400	1600	1700	2000	400
7.4%	225	450	600	675	750	900	1050	1125	1350	1575	1800	2025	2250	450
8.2%	250	500	667	750	833	1000	1167	1250	1500	1750	2000	2250	2500	500
9.0%	275	550	733	825	917	1100	1283	1375	1650	1925	2200	2475	2750	550
9.9%	300	600	800	900	1000	1200	1400	1500	1800	2100	2400	2700	3000	600
10.7%	325	650	867	975	1083	1300	1516	1625	1950	2275	2600	2925	3250	650
11.5%	350	700	933	1050	1167	1400	1633	1750	2100	2450	2800	3150	3500	700
	30	60	80	90	100	120	140	150	180	210	240	270	300	
	GROUND SPEED (KNOTS)													

NOTES:

1. Rate of climb required VSI (ft/min) = Gradient percent x Ground speed (kt) x 1.013.

2. Gradient percent* = $\frac{\text{VSI (ft/min)}}{\text{Ground speed (kt)} \times 1.013}$

3. Feet per nautical mile (ft/NM) = $\frac{\text{VSI (ft/min)} \times 60}{\text{Ground speed (kt)}}$

* An approximate method is to divide rate of climb by groundspeed in kt. This will give an accurate answer to one decimal place for gradients up to 4%, and for gradients up to 12% apply a correcting factor of minus 0.1%.



2.2 Published Instrument Departure Procedures

2.2.1 Published instrument departure procedures consist of Standard Instrument Departures (SID) and departure procedures included in AD 2.24, which are used to standardise departure instructions, reduce RTF congestion and the chance of error in aircraft routing, and provide positive routing for aircraft suffering communications failure.

2.2.2 The SID specifies in both diagrammatic and narrative form any of the following: the direction of turn, headings, track, distances, significant points and altitude requirements. Where tracking to or from a navigation aid is not possible, desired tracks are shown and due allowance for wind is to be made. Aircraft are to continue climbing throughout the SID unless in compliance with published ATC altitude restrictions, segment MSA or an appropriate form of terrain protection i.e. Radar terrain, Area MSA, 25 NM MSA, VORSEC chart or above FL160.

2.2.3 SID are identified by one or more of the following: departure runway, direction of turn, route of the SID, significant point associated with the SID, a validity number and a route indicator.

2.2.4 SID may also include transitions. A transition joins the end point of the SID with the ATS route the aircraft is to intercept. A SID may have a number of transitions, each to a different route.

2.2.5 All instrument departure procedures, designed to PANS OPS II criteria, portray the minimum net climb gradient required to achieve the designed obstacle clearance margins for the tracks shown, originating from a point 16 ft above the departure end of the runway.

2.2.6 MSA may be depicted on the relevant chart. The segment MSA represents the lowest altitude for obstacle clearance on each segment of the procedure (including transitions). The pilot shall continue to climb at or above the published PDG until reaching the segment MSA. It remains the responsibility of the pilot to meet the subsequent departure segment and/or enroute MSA, MFA, MRA and MEA requirements applicable on the SID and after SID termination. The segment MSA does not ensure controlled airspace containment.

2.2.7 Operators or pilots should establish procedures to ensure compliance with the SID. The application of a performance margin on the published climb requirements is at the operator's/pilot's discretion taking into account the achievable climb performance of the aircraft and the means of monitoring the gradient achieved.

2.2.8 Unless otherwise specified the SID performance requirements are:

- (a) make good a minimum climb gradient of 3.3% or 200 ft per NM (CAT H 5.0% or 300 ft per NM);
- (b) climb on runway centreline to 400 ft (CAT H 295 ft) above the departure end of the runway before commencing a turn;

- (c) the maximum IAS for turns during the SID procedure, assuming an average achieved bank angle of 15 degrees, are:
- | | | |
|-------|---------------------------|--------|
| (i) | Category A | 120 kt |
| (ii) | Category B | 165 kt |
| (iii) | Category C | 265 kt |
| (iv) | Category D/D _L | 290 kt |
| (v) | Category H | 100 kt |

Warning: Wherever limiting speeds other than these are promulgated, they must be complied with to achieve the planned obstacle clearance margins.

2.2.9 Aircraft flying published instrument departure procedures based on terrestrial navigation aids must **fly-over** associated NAVAID's/Fixes unless otherwise instructed. Operators using FMS to fly these conventional procedures must ensure the procedures are appropriately coded in their FMS to achieve this requirement.

2.2.10 Where an instrument departure procedure contains a traffic management requirement to maintain a specified altitude to a reporting point or distance, ATC may amend or delete this requirement prior to or after take-off. ***An ATM Climb Gradient (ATM CG) to achieve this will be promulgated if greater than 5%. The ATM CG will provide reasonable assurance that the aircraft will achieve the ATC altitudes required. The ATM CG will incorporate airspace containment.*** All other tracking and altitude requirements must be complied with.

2.2.11 When an instrument departure contains a "cross at or above" requirement pilots must advise ATC if this requirement cannot be met. This requirement will not apply if the aircraft has been cleared to a level which is below the level in the requirement.

2.2.12 ATC may cancel an instrument departure procedure either prior to or after take-off, in which case alternative departure instructions will be issued. The cancellation will be achieved by use of the phrase:

2.2.13 "CANCEL SID (*alternative instructions*)".

2.2.14 Once an instrument departure procedure has been cancelled it will not be reinstated or an alternative instrument departure procedure offered except with the specific approval of the pilot.

2.2.15 SIDs terminate when the aircraft is established on the cleared route.

2.2.16 The pilot must advise ATC if cleared via a SID that requires the use of navigation aids not available to the pilot or when the aircraft performance will not enable the published criteria to be achieved.

2.2.17 When it is not possible to nominate a specified SID, ATC will issue any required departure instructions in plain language.

2.3 Take-off Minima

2.3.1 CAR Part 91, in conjunction with CAR Part 19, prohibits the pilot of an aircraft from taking-off from an aerodrome under IFR unless weather conditions are:

- (a) at or above the weather minima for IFR take-off detailed in the Operational Data chart for that aerodrome in AD 2: or
- (b) if weather minima for IFR take-off are not detailed in AD 2 for a particular aerodrome, a ceiling of at least 300 ft and above 1500 m visibility.

2.4 Reduced Take-off Minima

2.4.1 Notwithstanding the previous paragraph, CAR 91.413 (g) provides that the pilot of an aircraft may take-off under IFR at an aerodrome at a take-off minima of zero cloud ceiling and visibility at or above 800 m provided that:

- (a) the runway to be used has centreline marking or centreline lighting; and
- (b) the take-off weather visibility is confirmed by the pilot by observation of the runway centreline marking or centreline lighting; and
- (c) AD 2 allows for reduced take-off minima on the runway to be used; and
- (d) any obstacles in the take-off flight path are taken into account; and
- (e) if the aircraft is a two-engine propeller-driven aeroplane, it is equipped with an operative auto-feather or auto-coarse system.

2.4.2 Further, CAR Parts 121, 125, and 135 allow the holder of an air operator certificate to operate aircraft at lower take-off minima than those outlined in 2.4.1 provided:

- (a) they comply with the provisions of CAR 121.163, 125.163, or 135.163 as appropriate; and
- (b) a serviceable secondary power supply and automatic switch-over is available.

3 HOLDING PROCEDURES

3.1 Holding Areas

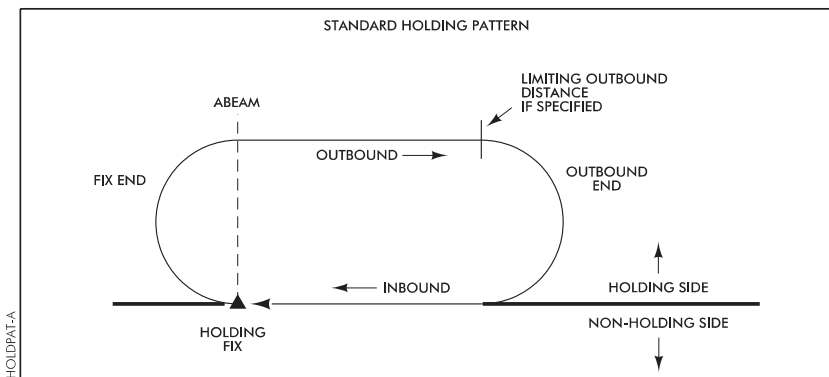
3.1.1 Holding areas are calculated for protection from terrain and other air traffic on the basis of the procedures set out below. Compliance with all aspects of the procedures is therefore essential.

3.1.2 The minimum permissible holding altitude is based initially on a clearance of at least 1000 ft above obstacles in the holding area. The minimum value is increased up to 2000 ft over areas designated as mountainous zones.

3.2 Standard Holding Pattern

3.2.1 The standard holding pattern is depicted in Figure ENR 1.5-1.

**Figure ENR 1.5-1
Standard Holding Pattern**



3.2.2 If the outbound leg length is based on a limiting distance, the outbound leg terminates as soon as the limiting distance is attained.

3.3 Holding Pattern Criteria

3.3.1 Unless otherwise specified, holding procedures are based on the following criteria:

Indicated Airspeed

3.3.2 Holding patterns must be entered and flown at or below the indicated airspeeds in Tables ENR 1.5-2 and ENR 1.5-3.

**Table ENR 1.5-2
Maximum IAS for Holding Patterns (Aeroplanes)**

Altitude	Normal Conditions	Turbulent Conditions
14,000 ft and below	230 kt* 170 kt (Cat A & B only)	280 kt 170 kt (Cat A & B only)
Above 14,000 ft up to 20,000 ft	240 kt	Lesser of 280 kt or M 0.8
Above 20,000 ft up to 34,000 ft	265 kt	Lesser of 280 kt or M 0.8
Above 34,000 ft	M 0.83	M 0.83

*When the holding pattern is followed by the initial segment of an instrument approach that has been designed at a higher speed than 230 kt, the higher speed applies.

**Table ENR 1.5-3
Maximum IAS for Holding Patterns (Helicopter)**

Altitude	Maximum IAS
Up to and including 6000 ft	100 kt
Above 6000 ft	170 kt

3.3.3 Notwithstanding the previous paragraph:

- Where the holding pattern speed for a particular instrument approach differs from that listed in Table ENR 1.5-2 or Table ENR 1.5-3, it will be clearly annotated on the chart.
- Subject to ATC clearance, the speed of 280 kt will be available for all enroute holding patterns, and approach holding patterns when under radar control. The ATC clearance may include a requirement for an increase in minimum holding altitude.
- Aircraft unable to comply with the speed restrictions listed in Table ENR 1.5-2 or Table ENR 1.5-3 are to advise ATC and request clearance for holding at an acceptable speed. This may result in an ATC requirement for an increase in the minimum holding altitude.

Outbound Timing

3.3.4 Outbound timing begins at the end of the turn onto the outbound leg or abeam the holding fix, whichever occurs later. The outbound track must then be flown:

- (a) for one minute if at 14,000 ft or below, or for one and a half minutes if above 14,000 ft; or
- (b) until the appropriate limiting distance is attained, where distance is specified.

3.3.5 When clearance is received specifying the time of departure from the holding point, the pilot should adjust their pattern within the limits of the established holding procedure in order to leave the holding point at the time specified.

Turns

3.3.6 All turns are to be made at a bank angle of 25°, or at a rate of 3° per second, whichever requires the lesser bank.

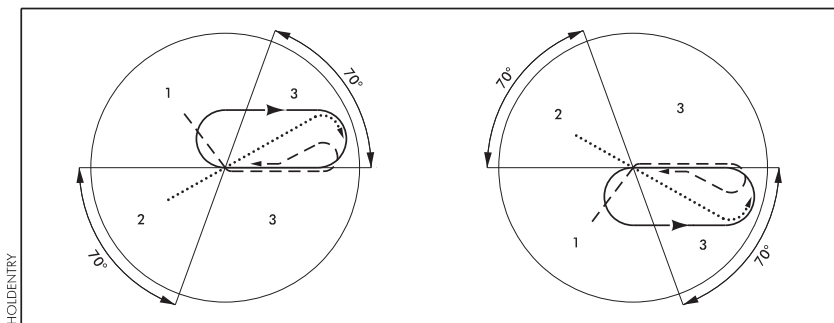
Wind Allowance

3.3.7 All procedures depict tracks and pilots should attempt to maintain track by making allowance for known wind by applying corrections both to heading and timing during entry and while flying in the holding pattern.

3.4 Entry Procedures

3.4.1 Entry into a holding pattern must be according to heading in relation to the three entry sectors shown in Figure ENR 1.5-2, recognising a zone of flexibility of 5° on either side of sector boundaries. In the case of holding on a VOR/DME fix the entry track is limited to either the VOR radial or DME arc.

**Figure ENR 1.5-2
Holding Pattern Entry Sectors**



Sector 1 Entry Procedure (Parallel Entry)

3.4.2 Entry into a holding pattern from Sector 1 is as follows:

- (a) on reaching the holding fix, the aircraft is turned to the reciprocal of the holding pattern inbound track for the appropriate period of time or until reaching the limiting outbound distance, if published; then
- (b) the aircraft is turned onto the holding side to intercept the inbound track until reaching the fix; and then
- (c) the aircraft is turned to follow the holding pattern.

Sector 2 Entry Procedure (Offset Entry)

3.4.3 Entry into a holding pattern from Sector 2 is as follows:

- (a) on reaching the holding fix, the aircraft is turned onto a heading to make good a track making an angle of 30° from the reciprocal of the inbound track on the holding side; then
- (b) the aircraft is flown outbound:
 - (i) for the appropriate period of time, or
 - (ii) until the appropriate limiting distance is attained, where distance is specified; or
 - (iii) where a limiting radial is also specified, either by the limiting DME distance or the limiting radial, whichever comes first; then
- (c) the aircraft is turned to intercept the inbound holding track until reaching the holding fix; and then
- (d) the aircraft is turned to follow the holding pattern.

Sector 3 Entry Procedure (Direct Entry)

3.4.4 When entering a holding pattern from Sector 3, on reaching the holding fix the aircraft is turned to follow the holding pattern.

DME Arc Entry

3.4.5 When entering a holding pattern from a DME Arc, on reaching the holding fix the aircraft must enter the holding pattern in accordance with either the Sector 1 or Sector 3 entry procedure.

Time/Distance Outbound (Sector 1 and Sector 2 Procedures)

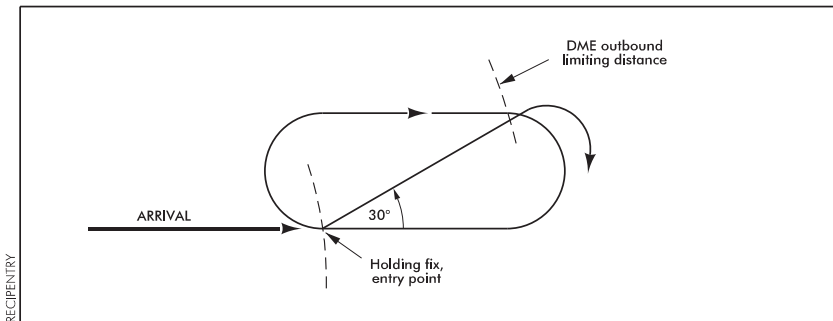
3.4.6 The still air time for flying the outbound entry heading should not exceed one minute if at 14,000 ft or below, or one and a half minutes if above 14,000 ft. The length of the outbound leg may be specified and flown in terms of distance instead of time.

Special VOR/DME Fix Entry

3.4.7 Where a special entry procedure is used, the entry radial is clearly depicted. The entry depends on the direction of arrival to the fix.

- (a) tracking on the inbound radial: The entry consists of following the holding pattern.
- (b) tracking on the reciprocal of the inbound radial: On arrival over the fix, turn onto the holding side on a track making an angle of 30 degrees with the reciprocal of the inbound track until reaching the DME outbound limiting distance, turn to intercept the inbound radial. Where a limiting radial is published, if this radial is encountered prior to reaching the limiting DME distance, maintain the radial until to outbound DME distance then turn to intercept the inbound radial, as depicted in Figure ENR 1.5-3.

Figure ENR 1.5-3
Special VOR/DME Fix Holding



3.5 Application of Holding Procedures

3.5.1 Enroute holding patterns are depicted on ENRC and ARC charts, and are for use by all aircraft.

3.5.2 Holding patterns depicted on Instrument Approach and STAR charts are designed for use by aircraft whose performance permits operation at the aerodrome associated with the holding and approach procedure.

3.5.3 As aircraft holding at higher airspeeds need larger areas of airspace for obstacle clearance purposes, this will generally result in a higher minimum holding altitude for enroute holding. This may occur although both the enroute and approach holding patterns are based on the same NAVAID and have similar orientation.

3.5.4 In the application of ATC lateral separation, an aircraft is not established in a holding pattern until:

- (a) Sector 1 or 2 joining procedures are complete; or
- (b) the aircraft has crossed the aid/fix in a Sector 3 entry.

3.6 Holding Instructions

3.6.1 Published holding patterns will be identified by one or more of the following:

- (a) the name of NAVAID, significant point or fix;
- (b) the type of NAVAID;
- (c) the runway associated with the instrument approach;
- (d) the instrument approach procedure identifier;
- (e) the instrument approach segment identifier;
- (f) for enroute holding patterns, the term ENROUTE

3.6.2 Holding instructions may include a maximum holding speed and entry/exit restrictions.

3.6.3 Aircraft may also be cleared to hold:

- (a) at a distance, or between two distances, on a VOR radial; or
- (b) at a distance from, or at, a significant point or fix on an ATS route or arrival procedure.

3.6.4 Instructions will include:

- (a) the name and type of the NAVAID, or the name of the significant point or fix;
- (b) distance or distances;
- (c) level instructions, which will be at or above an approved area minimum altitude or at or above the minimum levels for radar control (see ENR 1.6);
- (d) direction of the holding pattern;
- (e) timing of outbound leg (only if a limiting distance not specified).

3.7 Onwards Clearance Time

3.7.1 In the event that an aircraft is held enroute or at a location other than the initial approach fix, the aircraft will be given an onwards clearance time from the holding location.

3.7.2 This time is the time an aircraft can expect to leave the holding location.

3.8 Expected Approach Time

3.8.1 In the event that an aircraft is instructed to hold at an initial approach fix, if the delay will exceed five minutes an expected approach time will be passed.

4 ARRIVING FLIGHTS

4.1 Aircraft Category

4.1.1 The categories used to determine the approach minima for aircraft are provided in Table ENR 1.5-4.

4.1.2 The categories are based upon V_{at} , where:

- (a) V_{at} is the indicated airspeed at the threshold;
- (b) $V_{at} = 1.3 \times V_{s0}$; and
- (c) V_{s0} is the stalling speed in the landing configuration at maximum certificated landing weight.

4.1.3 An aircraft must fit into and be operated in accordance with the requirements of only one category. An aircraft:

- (a) may not reduce category because of reduced operating weight; but
- (b) must increase category when actual handling speeds are in excess of those for the category.

**Table ENR 1.5-4
Aircraft Category**

CATEGORY	V_{at}
A	Less than 91 kt IAS
B	91 kt or more but less than 121 kt IAS
C	121 kt or more but less than 141 kt IAS
D/D _L	141 kt or more but less than 166 kt IAS
E	166 kt or more but less than 211 kt IAS
H (Helicopter)	Not applicable

4.1.4 The approach minima for aircraft categories listed in Table ENR 1.5-4 are included on instrument approach charts included in AD 2.

4.2 Standard Arrival Route (STAR)

4.2.1 Standard arrival routes (STAR) are used to reduce RTF, standardise arrival instructions, reduce the possibility of error in aircraft routing, and provide a positive routing for aircraft suffering communications failure.

4.2.2 The STAR specifies in both diagrammatic and narrative form routing, to a point where an instrument approach can be flown to destination, showing any of the following:

- (a) a transition route;
- (b) an arrival route;
- (c) vertical navigation requirements to segregate traffic;
- (d) speed restrictions to assist in regulating the flow of arriving traffic;
- (e) MSA for each route segment, and a 25 NM MSA.

Aircraft are to descend to ATC cleared level and, where published, in accordance with the published STAR profile.

4.2.3 STAR are identified by the reporting point at which the arrival route starts, followed by a validity number to indicate the current procedure, followed where necessary by a route indicator.

4.2.4 Transitions are named after the fix on an ATS route at which the transition starts, and join the ATS route to the arrival route. A STAR may have a number of transitions, each from a different route.

4.2.5 A level requirement depicted on a STAR chart does not authorise a pilot to descend to meet that requirement. ATC will assign descent to permit compliance with vertical navigation requirements or advise otherwise. Pilots must advise ATC if a level requirement cannot be met.

4.2.6 Where necessary, an aircraft under radar control may be taken off the STAR with the expectation that it will rejoin the STAR at a subsequent waypoint. In these situations the STAR will not be cancelled but the reason will be given along with the expected point of rejoining the STAR.

4.2.7 A STAR may be cancelled by use of the phrase "*Cancel STAR*". Once a STAR is cancelled it will not be reinstated. In the event of a communications failure after a STAR has been cancelled, pilots are to follow standard communications failure procedures.

4.2.8 The pilot must advise ATC if cleared via a STAR that requires the use of navigation aids not available to the pilot.

4.2.9 When it is not possible to nominate a specified STAR, ATC will issue any required arrival instructions in plain language.

4.2.10 Clearance for a STAR does not constitute clearance for instrument approach.

4.3 Approach Sequence

4.3.1 The approach sequence will be established in a manner that facilitates the arrival of the maximum number of aircraft with the least average delay.

4.3.2 Priorities applied by ATC are provided in ENR 1.1, 10.1.1 and 10.1.2.

4.3.3 At controlled aerodromes ATC will advise the most appropriate instrument approach procedure taking into account weather and traffic conditions. When appropriate a visual approach may be nominated. Where instrument approach procedures are not runway specific (e.g. Nelson VOR/DME A), or for ATC traffic management reasons, this advice will specify the runway-in-use and may include circling instructions.

4.3.4 Notwithstanding a pilot may at any time request to fly an instrument approach other than that nominated by ATC. Pilots should advise ATC as soon as possible of their preferred approach so that the most advantageous sequencing may be arranged for the type of approach to be flown.

4.3.5 At uncontrolled aerodromes pilots should use the designated instrument approach procedure for the runway-in-use. Other instrument approach procedures may be used only if:

- (a) the reported MET conditions indicate the aircraft will comply with standard visual joining procedures; and
- (b) account is taken of other IFR and VFR air traffic in the vicinity.

4.4 Minimum Initial Approach Altitude

4.4.1 A clearance for an IFR aircraft to carry out an instrument approach:

- (a) except where otherwise instructed, authorises the aircraft to descend to the minimum procedure commencement altitude in accordance with:
 - (i) STAR;
 - (ii) RNAV/RNP arrival;
 - (iii) Route MSAs including distance steps;
 - (iv) 25 NM MSA sector altitude chart;
 - (v) TAA;
 - (vi) VORSEC chart; and
- (b) may include level restrictions applicable prior to approach commencement; and
- (c) may include level restrictions associated with circuit integration.

4.4.2 Except when under radar control, or in accordance with a specific arrival procedure promulgated in AD 2, the minimum initial approach altitude issued to an aircraft that is to carry out an instrument approach must be the higher of:

- (a) the minimum procedure commencement altitude shown on the instrument approach chart; or
- (b) the MSA for the route sector.

The MSA for the route sector will be determined using one of the following procedures. Where more than one option is available the procedure that offers the lowest MSA will be used.

- (i) the MSA for the ATS route including enroute descent (Distance) steps;
- (ii) the MSA after VORSEC chart steps;
- (iii) the altitude quoted in the 25 NM MNM Sector Altitude diagram;
- (iv) on an RNP approach, the altitude quoted in the TAA diagram.

4.4.3 An aircraft operating under VFR, required to make an IFR approach due to local MET conditions, may be cleared to commence the approach at a lower initial approach altitude than the minimum specified in 4.4.1. The aircraft may be cleared to commence the approach from overhead the facility in VMC at either:

- (a) the procedure or base turn altitude; or
- (b) the minimum inbound overheading altitude where the procedure authorises final descent after re-crossing the facility on final approach.

4.5 Joining a Navigation Aid for a Base Turn Instrument Approach

4.5.1 Aircraft arriving overhead the navigation aid within $\pm 30^\circ$ of the base turn outbound course, can join the procedure directly, i.e. when overhead, turn to intercept the outbound leg of the base turn.

4.5.2 If arriving from any other direction, a course reversal has to be performed before joining the base turn outbound leg. This is done utilising the published holding pattern overhead the navigation aid and the standard holding entry procedures.

4.5.3 In the case of a holding pattern positioned on the same side of the navigation aid as the base turn procedure, the published procedure turn has to be utilised for course reversal following the holding pattern entry.

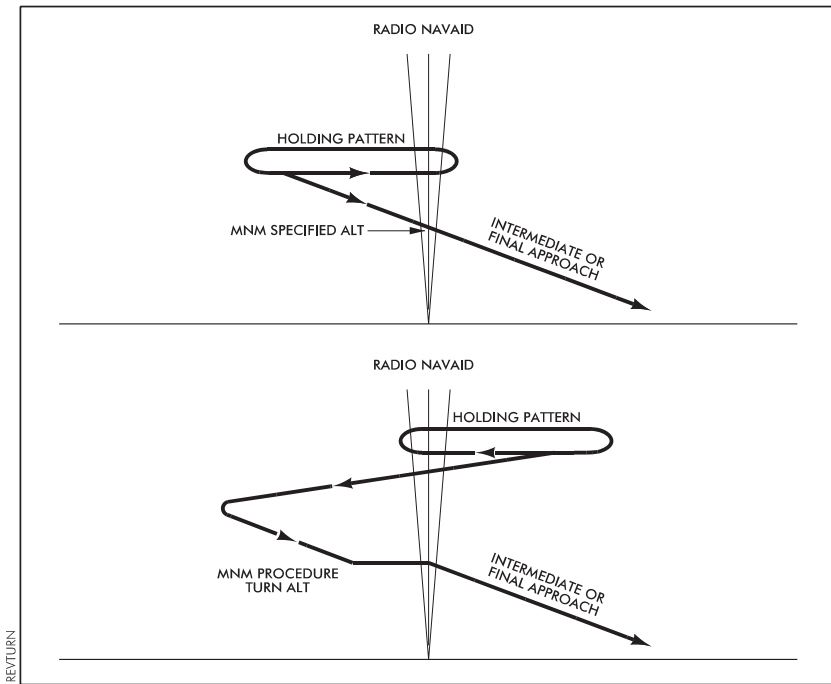
4.6 Procedure Commencement Altitude

4.6.1 Where the instrument approach chart shows the procedure commencement altitude as a minimum, the use of a higher commencement altitude is permissible, dependent upon the aircraft's descent performance capability while conforming to the procedural limitations of time and/or distance.

4.6.2 Alternatively, the procedure may authorise aircraft established in the holding pattern to descend on the inbound holding track to cross the NAVAID at or above the minimum altitude depicted. This may apply where the aircraft:

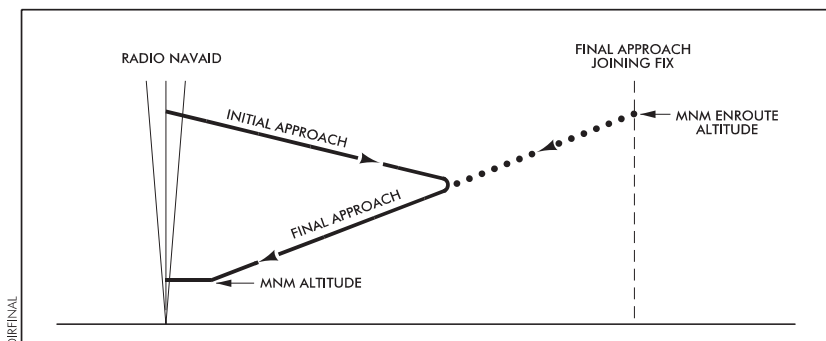
- (a) is taking up the outbound heading of a teardrop procedure;
- (b) is joining final approach at the NAVAID;
- (c) is required to execute a reversal turn prior to carrying out the above procedures as depicted in Figure ENR 1.5-4.

Figure ENR 1.5-4
Reversal Turn Prior to Joining Final Approach



4.6.3 In certain cases aircraft may be cleared to join final approach track direct from enroute. In these circumstances the final approach commences at a fix on the final approach track up to which enroute terrain clearance applies as depicted in Figure ENR 1.5-5.

Figure ENR 1.5-5
Joining Final Approach Direct from Enroute



4.7 Protection of ILS Critical and Sensitive Areas

4.7.1 Large reflecting objects, including aircraft or vehicles within the radiated signal coverage, may cause multipath interference to the ILS localiser and glide path.

4.7.2 ATC provides varying levels of protection of ILS critical or sensitive areas based on the category of approach, the position of an aircraft on the approach and the prevailing weather conditions at the time the approach is commenced:

- (a) when weather conditions are at or below a ceiling of 1200 ft and/or visibility less than 5 km but equal to or better than CAT I ILS minima, protection of critical areas of the localiser and glide path is provided from the time an aircraft on approach is within 4 ILS/DME (4 NM from touchdown) until the aircraft has landed; or
- (b) at aerodromes served by CAT II and III ILS, when weather conditions are below CAT I ILS minima:
 - (i) protection of critical areas of the localiser and glide path is provided from the time an aircraft on CAT II/III ILS approach is within 4 ILS/DME (4 NM from touchdown) until the aircraft has landed and completed its landing roll; and
 - (ii) protection of sensitive areas of the localiser and glide path is provided from the time an aircraft on CAT II/III ILS approach is within 2 ILS/DME (2 NM from touchdown) until the aircraft has landed and completed its landing roll.

4.7.3 ATC does not provide protection of ILS critical and sensitive areas when:

- (a) the aircraft on ILS approach is beyond the distances from touchdown specified in 4.7.2 (a) and (b) above; and/or
- (b) weather conditions are better than those specified in 4.7.2 (a) above.

4.7.4 Aircraft on ILS approaches may experience fluctuations in the localiser and/or glide path course (particularly when the critical/sensitive areas are not being protected) when a preceding aircraft:

- (a) passes over or through the localiser critical/sensitive area while departing, landing or executing a missed approach on the same or another runway, or
- (b) taxis through the glide path critical/sensitive area for departure.

4.7.5 When a preceding Code E (e.g. B777) or larger wide body aircraft will use the full length to vacate the runway, ATC will warn the following aircraft on ILS approach by use of the phraseology:

"ILS FLUCTUATIONS MAY BE EXPERIENCED (reason; e.g. "ILS CRITICAL (and/or SENSITIVE) AREA(S) INFRINGED").

4.7.6 To assist in identifying the cause of any anomalous course disturbances pilots should advise ATC immediately they are observed.

4.7.7 Pilots of aircraft flying coupled approaches should be especially alert in monitoring the automatic flight control system.

4.7.8 When the critical/sensitive areas are being protected and there is an inadvertent incursion into the critical/sensitive area by an aircraft or vehicle, ATC will warn the aircraft on ILS approach by use of the phraseology:

"ILS FLUCTUATIONS MAY BE EXPERIENCED (reason; e.g. "ILS CRITICAL (and/or SENSITIVE) AREA(S) INFRINGED").

4.8 Practice ILS Auto-Landings and ILS Auto-Landings

4.8.1 Practice ILS auto-land operations may be available at Auckland and Christchurch airports only, and when weather conditions are better than CAT I ILS minima.

4.8.2 When protection of critical/sensitive areas is not required, pilots wishing to conduct a practice auto-land must advise ATC of their intention as early as practicable in order that ATC is able to either:

- (a) protect the ILS critical and sensitive areas; or
- (b) advise that due to traffic protection of ILS critical and sensitive areas will not be provided using the phraseology:
"ILS CRITICAL AND SENSITIVE AREAS NOT PROTECTED"

4.8.3 Practice ILS auto-land and ILS auto-land operations are NOT available at Wellington and Dunedin.

4.9 Instrument Approach Procedures — General

4.9.1 The pilot of an aircraft intending to land at any aerodrome where instrument approach procedures have been prescribed, must comply with those procedures where the MET conditions at the time require the procedures to be followed.

4.9.2 In order to ensure separation from aircraft operating in the vicinity of an aerodrome, IFR flights in controlled airspace may be cleared for an instrument approach and issued with a descent restriction prior to reporting visual reference, provided:

- (a) the reported or known cloud base is at least 1000 ft above the altitude specified in the descent restriction; and
- (b) visibility is equal to or greater than 8 km; and
- (c) the reason for the descent restriction is passed to the pilot.

4.9.3 In addition, an IFR flight that cannot be cleared for an instrument approach because of conflicting traffic operating below it may be cleared to intercept the associated DME arc or the outbound track (initial approach segment) of the approach with a descent restriction above the conflicting traffic provided that:

- (a) a reasonable assurance exists that the descent restriction can be cancelled and an approach clearance issued before the aircraft intercepts the final approach track; and
- (b) the reason for the descent restriction is passed to the pilot; and
- (c) the approach clearance is issued in sufficient time to allow the flight to fly an approach profile appropriate to the aircraft type. ATC will use a descent profile of 300 ft per nautical mile as a general guide but if doubt exists the pilot's advice will be sought.

"JOIN DME ARC FOR (type of instrument approach), MAINTAIN ...FT, TRAFFIC ..."; or

"TRACK OUTBOUND ON (reversal track of the instrument approach), MAINTAIN ...FT, TRAFFIC ..."

4.9.4 When the confliction has been resolved ATC will clear the IFR flight for the approach.

"CLEARED (type of instrument approach) RWY ..."

4.9.5 If for any reason a clearance for the approach is not issued or acknowledged prior to the flight intercepting the final approach track, the pilot must maintain the last assigned level until established on the final approach track, and then commence approach. See communications failure procedures specified in ENR 1.15.

4.10 Instrument Approach Procedures — Speed

4.10.1 A specified range of landing speeds for each category of aircraft are assumed for use in calculating airspace and obstacle clearance requirements for each instrument approach procedure. These speeds are provided in Table ENR 1.5-5.

Table ENR 1.5-5
Speeds for Procedure Calculations (knots IAS)

Aircraft Category	V _{at}	Range of Speeds for Initial Approach	Range of Final Approach Speeds	Max Speeds for Visual Manoeuvring (Circling)	Max Speeds for Missed Approach +
A	<91	90 – 150 (110*)	70 – 100	100	110
B	91 – 120	120 – 180 (140*)	85 – 130	135	150
C	121 – 140	160 – 240	115 – 160	180	240
D/D _L	141 – 165	185 – 250	130 – 185	205	265
E	166 – 210	185 – 250	155 – 230	240	275
H	N/A	70 – 120 (#100,×110)	60 – 90	N/A	90

V_{at} As defined in 4.1.2.

* Maximum speed for reversal procedures.

+ Unless otherwise specified on instrument approach charts.

Maximum speed for reversal procedures up to and including 6000 ft.

× Maximum speed for reversal procedures above 6000 ft.

4.10.2 An aircraft may use a higher category speed, or fly a higher category procedure provided that:

- (a) the minima and restrictions for higher category are authorised and complied with; and
- (b) where approach control is provided by a non-radar unit, prior approval has been obtained from ATC before commencing the approach.

4.11 Instrument Approach Procedures — Procedure Timing

4.11.1 The procedural airspace used when designing a civil instrument approach procedure takes into account the highest authorised aircraft approach speed appropriate to the particular aerodrome it serves and a 60 kt head or tailwind. Intermediate approach obstacle clearance limits and final approach minimum altitudes are determined from a study of obstacles occurring within the airspace.

4.11.2 To ensure that the obstacle clearance margins are not infringed, no increase in the instrument approach procedure outbound time or DME distance is authorised, except that, where aircraft are operated on the outbound leg of the teardrop instrument approach procedure at indicated air speeds significantly lower than the maximum authorised for the procedure, the outbound timing may be adjusted in accordance with Table ENR 1.5-6.

Table ENR 1.5-6
Instrument Approach Procedure — Timing Adjustment

Procedure timing shown on chart	Modified procedure timing related to aircraft approach speed (IAS)	
	91–110 kt	70–90 kt
2 min	2.5 min	3 min
3 min	4 min	4.5 min

4.11.3 Outbound time or DME distance may be shortened, provided that the wind velocity at the relevant altitudes has been confirmed by an immediately preceding instrument approach to the effect that minimum altitude may be reached at an acceptable descent rate during final approach.

4.11.4 When outbound time and an outbound DME distance limit for a reversal procedure are shown together on an approach chart, the turn onto the inbound track shall be started within the specified time or upon reaching the limiting DME distance, whichever occurs first.

4.12 Instrument Approach Procedures — Descent Rates

4.12.1 The height difference between procedure commencement minimum and intermediate approach minimum may be such that 650 fpm descent rate is required if a pilot wishes to reach the minimum by the end of the intermediate approach.

4.13 Instrument Approach Procedures — Reversal Procedures

Types of Manoeuvre

4.13.1 The reversal procedure may be in the form of a procedure turn, a base turn, or a racetrack. Strict adherence to the directions and timing is required to remain within the design airspace. Entry track to the procedures must be within $\pm 30^\circ$. Except for DME limited procedures, reversal speed limitations as shown in Table ENR 1.5-5 apply from procedure commencement as shown in Figure ENR 1.5-6.

45° Procedure Turn

4.13.2 A 45° procedure turn consists of a specified outbound track and timing from the facility or fix, a 45° turn away from the outbound track for one minute from the start of the turn for categories A and B aircraft (one minute 15 seconds for categories C, D and E aircraft), followed by a 180° turn in the opposite direction to intercept the inbound track. An 80° procedure turn may also be used when a 45° procedure turn is depicted.

80° Procedure Turn

4.13.3 An 80° procedure turn consists of a specified outbound track and timing from the facility or fix, an 80° turn away from the outbound track, followed by a 260° turn in the opposite direction to intercept the inbound track.

Base Turn

4.13.4 A base turn consists of a specified outbound track and timing from a facility, followed by a turn to intercept the inbound track.

Racetrack

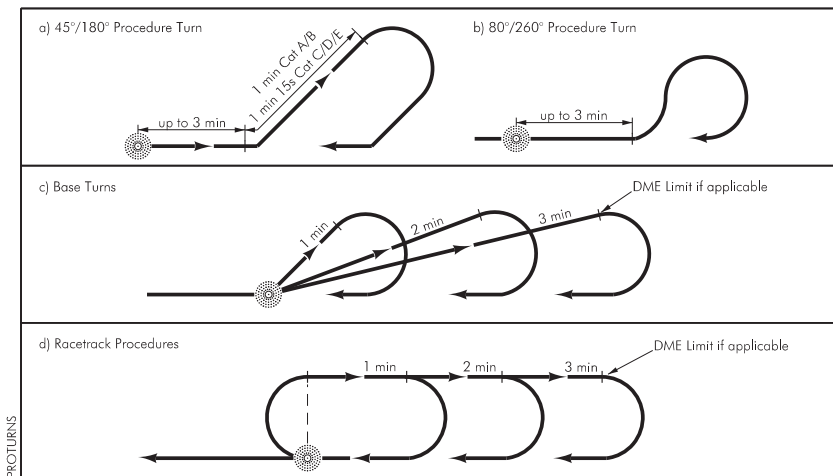
4.13.5 Racetracks are similar to holding patterns but, because they are reversal procedures, the following considerations also apply:

- Procedure entry track is within $\pm 30^\circ$ unless entry is protected, e.g. within a suitable holding pattern.
- Speed not above maximum applicable to the published aircraft category, as shown in Table ENR 1.5-5.
- When a longer outbound time is published, the sector 2 30° offset entry is limited to one minute 30 seconds then the outbound track is paralleled for the remainder of the time or distance.
- During a Sector 1 parallel entry the inbound final approach track must be intercepted prior to the facility.
- Manoeuvring, as far as is possible, will be done on the holding side of the inbound track.
- Specified minimum altitudes apply until the aircraft is established on the final inbound track. "Established" is considered to be half scale deflection for ILS or VOR, within 5° of an NDB track.

Dead Reckoning (DR) Segment

4.13.6 Where an operational advantage can be obtained, the procedure may include a DR segment from a fix. The DR track will intersect the approach track at 45° or less.

**Figure ENR 1.5-6
Procedure Turns**



4.14 Initial Approach Using DME Arc

4.14.1 Where an initial approach using a DME arc is provided, the intersection of the specified inbound route or track and the DME arc constitutes the fix defining the commencement of the DME arc initial approach segment.

4.14.2 A DME arc provides a circular path which enables a direct feed-in to the final approach track of an instrument approach without first having to overhead the facility providing final approach guidance.

4.14.3 The characteristics and requirements of DME arc initial approach segment are:

- (a) pilots are expected to anticipate the lead distance required for commencement of turn onto the arc, and a radial or bearing is published that provides at least 2 NM lead distance for the turn onto final approach;
- (b) DME arc initial approach segments are available only to those aircraft whose route or track intersects the DME arc within the limiting arc bearings depicted on the instrument approach chart to be used. The DME arc is executed by maintaining the circular path depicted on the instrument approach chart by a curved dotted line with arrowhead to show direction of tracking;
- (c) the altitude to be maintained while joining a DME arc must be not less than the minimum safe altitude specified for the route or track from which arrival is made or the altitude specified for the applicable segment of the DME arc, whichever is the higher;
- (d) only when the pilot has established the aircraft on the circular path depicted on the instrument approach chart, and if in controlled airspace after receiving a descent clearance from ATC, may descent be made to the minimum altitude specified for that segment of the arc or the cleared level if higher;
- (e) minimum altitudes specified on DME arc provide not less than 1000 ft terrain or obstacle clearance within an area extending 2.5 NM each side of arc; and
- (f) in controlled airspace the DME arc procedure is only to be flown when a specific ATC clearance has been received.

4.14.4 At controlled aerodromes arrival procedures may be published that enable a pilot to track from overhead the facility outbound on a specified track to intercept the DME arc from the inside and then fly the DME arc to intercept final approach track. The only other times intercepting the DME arc from the inside is permitted are when the aircraft is:

- (a) under radar control; or
- (b) VFR, or in VMC until established on the final approach track.

4.15 Operation Below DA, DH, or MDA

4.15.1 CAR 91.413 requires that, where a DA, DH or MDA is applicable, the pilot must not operate an aircraft at any aerodrome below the MDA or continue an instrument approach procedure below the DA or DH unless:

- (a) the aircraft is continuously in a position from which a descent to a landing on the intended runway can be made at a normal rate of descent using normal manoeuvres that will allow touchdown to occur within the touchdown zone of the runway of intended landing; and
- (b) on a circling approach, maintain the aircraft within the appropriate circling area; and
- (c) the flight visibility is not less than the visibility prescribed for the instrument approach being used; and
- (d) at least one of the following visual references for the intended runway is distinctly visible and identifiable to the pilot:
 - (i) the approach lighting system; or
 - (ii) the threshold markings; or
 - (iii) the threshold lights; or
 - (iv) the runway-end identification lights; or
 - (v) the visual approach slope indicator; or
 - (vi) the touchdown zone or touch down zone markings; or
 - (vii) the touchdown zone lights; or
 - (viii) the runway or runway markings; or
 - (ix) the runway lights.

4.16 Instrument Approach Procedures — Landing

4.16.1 The pilot must not land an aircraft when the flight visibility is less than that prescribed for the instrument approach procedure used.

4.17 Instrument Approach Procedures — Missed Approach Procedures

4.17.1 The published missed approach procedure **must** be executed:

- (a) if, at the missed approach point, including the specified DA or DH, the pilot has not established visual reference with any portion of the runway or visual landing aids in terms of the meteorological minima prescribed for the approach; or
- (b) an identifiable part of the aerodrome is not distinctly visible to the pilot during a circling manoeuvre at or above MDA; or
- (c) at any time during a final approach when directed by ATC.

4.17.2 If visual reference with the runway environment is lost while circling to land from an instrument approach, the missed approach procedure specified for the instrument approach procedure flown prior to the circling manoeuvre shall be followed. The transition from the circling manoeuvre to the missed approach should be initiated by a climbing turn within the circling area, towards the landing runway, to return to the circling altitude or higher, immediately followed by interception and execution of the missed approach procedure.

4.17.3 The circling manoeuvre may be carried out in more than one direction. For this reason, different patterns are required to establish the aircraft on the prescribed missed approach course depending on its position at the time visual reference is lost.

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4.17.4 Following a pilot initiated missed approach, the pilot must notify circumstances and intentions immediately:

- (a) if in controlled airspace, by advising ATC. If required ATC may issue additional instructions; or
- (b) if in uncontrolled airspace, by broadcasting on the appropriate ATS or unattended aerodrome frequency.

4.17.5 If a missed approach climb is initiated prior to the specified missed approach point the pilot is required to track to the missed approach point and then follow the missed approach procedure. The missed approach point may be over flown above MDA.

4.17.6 Aircraft are required to carry out mandatory turns at the missed approach point, at a waypoint, within defined distances or at an actual altitude. Where any part of a missed approach procedure requires a climb on a specified track to a MNM altitude before turning, within controlled airspace ATC may require an aircraft to climb on the same track to a higher altitude.

Turns

4.17.7 During missed approach turns, a minimum bank angle of 15° is assumed.

Climb

4.17.8 Where missed approach instructions include a holding altitude, in some cases by climbing at the minimum missed approach gradient the hold altitude won't be achieved. In these cases, aircraft shall continue to climb in the hold to the published altitude. At uncontrolled aerodromes a note (climb in hold if required) may be added to the missed approach text.

4.17.9 During the missed approach, to ensure separation from conflicting traffic, ATC may instruct an aircraft to climb at max rate to a specified altitude. Aircraft are required to achieve high vertical climb profile with the least delay. Essential traffic information will be passed, if appropriate.

Note: The missed approach procedure is designed to provide a minimum obstacle clearance of 98 ft to an aircraft climbing along the specified missed approach path at a gradient of 2.5% (150 ft/NM), Cat H 4.2% (260 ft/NM) from the prescribed point (MAPt-non-precision) or altitude/level (DA/H-precision) from which the missed approach procedure commences. If this climb gradient cannot be achieved (e.g. degraded climb performance with an engine inoperative under certain conditions of weight/temperature/altitude), the DA/H or MDA/H should be increased or other action taken to achieve the required obstacle clearance.

Approach Aid Failure

4.17.10 In the event of radio navigation aid failure before visual reference is established, the approach may be continued using a suitable alternative aid or procedure provided:

- (a) that the prevailing weather conditions are within the MET minima for the alternative procedure; and
- (b) in controlled airspace, position and intentions are advised to ATC.

4.17.11 If no alternative approach procedure is available the pilot must advise ATC of estimated position and intentions in order that separation from other IFR traffic may continue to be applied.

4.18 Amending Missed Approach Instructions — Controlled Airspace Only

4.18.1 ATC may amend missed approach instructions only under the following circumstances.

Instrument Training Aircraft Only

4.18.2 For traffic management purposes, ATC may instruct pilots of training aircraft who wish to carry out the published missed approach procedure to:

- (a) carry out a published instrument departure provided the clearance specifies that the departure commences visually over the associated runway; or,
- (b) climb on a specified track or heading within an evaluated climb sector provided the clearance specifies that the departure procedure commences visually over the associated runway; or
- (c) carry out a visual departure onto a specified track or heading; or
- (d) enter the circuit visually. This may be followed by:
 - (i) either of the three procedures listed above; or
 - (ii) the aircraft being cleared to join the published missed approach provided the clearance specifies that the aircraft is to position at or prior to the missed approach point **and** at or above MDA or DA.

4.18.3 The procedures in 4.18.2 are subject to the following conditions:

- (a) by day only; and
- (b) MET conditions must be equal to or better than circling minima for the approach category of the aircraft at the time the procedure will be flown.

4.18.4 Instructions will be issued in sufficient time for the pilot(s) to brief on the procedure. If the clearance is unacceptable to the pilot for safety reasons, the pilot must advise ATC.

4.19 Terminating the Missed Approach — Controlled Airspace Only

4.19.1 After the missed approach has been initiated ATC may terminate the missed approach and instruct an aircraft to fly a procedure other than the missed approach procedure as follows:

- (a) when the aircraft is under radar control and is at or above the minimum radar terrain contour level; or
- (b) is at or above the VORSEC chart or Area Minimum Altitude (AMA) shown on ENRC or ARC; or
- (c) is positioning for another approach and is at or above the 25 NM Minimum Sector Altitude (25 NM MSA).

4.20 Protection of the Missed Approach

4.20.1 ATC will ensure that the missed approach is protected so that separation will remain in place in the event that the aircraft carries out the missed approach.

4.20.2 For aircraft conducting an instrument approach and provided that the **Weather Criteria** and **Restrictions** listed below are also met, ATC may protect the missed approach by instructing the pilot to enter the aerodrome traffic circuit.

Weather Criteria

Aircraft Type	Weather Criteria — when the known weather conditions are equal to or better than:
Helicopter	Day and night: ceiling 1200 ft and visibility 5 km or the approach minima for the type of approach and category being flown whichever is the higher
Piston and Turboprop	Day: * ceiling 1200 ft and visibility 5 km or the circling minima for the type of approach and category being flown whichever is the higher Night: * ceiling 2000 ft and visibility 8 km or the circling minima for the type of approach and category being flown whichever is the higher
Jet	Day and night: * ceiling 2000 ft and visibility 8 km or the circling minima for the type of approach and category being flown whichever is the higher

* except at Wellington and Queenstown — see Restrictions

Restrictions

- Aircraft will not be instructed to enter the aerodrome traffic circuit when:
 - circling is not authorised for the type of approach and category being flown by the aircraft; or
 - the aircraft is approach category D or D_L; or
 - MET conditions such as fluctuating cloud base, severe turbulence, windshear or strong crosswinds are reported by ATC or broadcast on the ATIS; or
 - there is any cloud in the circuit area that could cause the pilot to lose sight of an identifiable part of the aerodrome; or
 - ATC has reason to believe that the pilot is not familiar with the aerodrome and its surrounding terrain; or
 - the pilot advises both Approach and Aerodrome control, each on first contact, that they do not wish to carry out this procedure.
- Aircraft will not be instructed to orbit on final.
- All published circling restrictions and requirements for the approach being flown are to be complied with.
- Both Approach Control and Aerodrome Control must be on watch.
- At Wellington, this procedure will not be issued to jet aircraft at night.
- At Wellington, aerodrome traffic circuit not available to CAT B, C, D/DL aircraft that go-around unless requested by the pilot and confirmed by aerodrome control. Request should be made on Tower Frequency.
- At Queenstown, this procedure will not be issued to piston, turboprop and jet aircraft at night.

4.20.3 Aircraft unable or no longer able to carry out this procedure **must advise** Approach or Aerodrome control immediately.

4.20.4 Aircraft that do not wish to carry out this procedure **must advise** both Approach and Aerodrome control, each on first contact, that they do not wish to carry out this procedure.

4.20.5 Refer to AD 1.6 — Go Around for procedures relating to visual approaches.

4.20.6 Refer to paragraphs 4.23.9-12 for procedures specific to Queenstown.

4.21 Straight-in Landing with Circling Minima

4.21.1 Even though only circling minima may be specified for a particular instrument approach procedure, a straight-in landing may be made if the pilot has the runway in sight in sufficient time to make a normal approach and landing, and requests and receives an appropriate clearance.

4.22 Visual Manoeuvring (Circling)

4.22.1 The MDA for the circling approach provides protection from obstacles within the circling area applicable to the performance category of the aircraft conducting the circling approach.

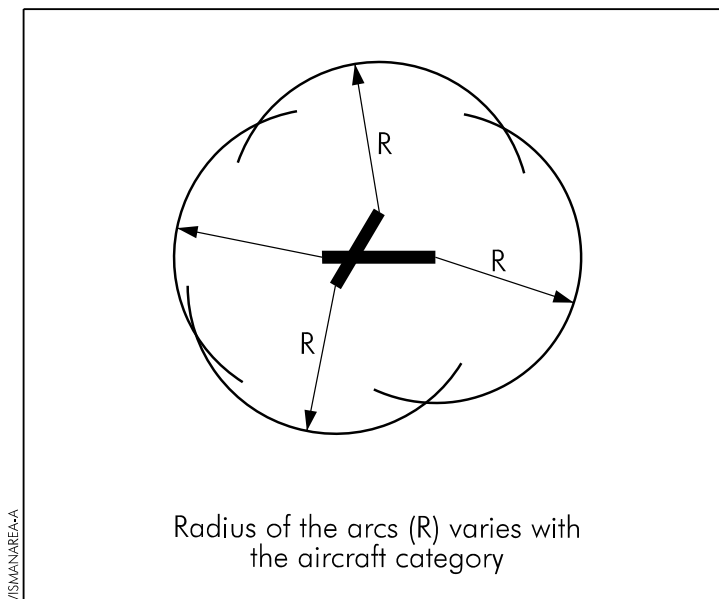
4.22.2 The circling area is determined by drawing an arc centred on the threshold of each usable runway and joining those arcs with tangents. The radius of the arc is determined from:

- (a) the aircraft TAS at maximum IAS for circling shown in Table ENR 1.5-5, calculated at 1000 ft above an aerodrome with 1000 ft elevation; and
- (b) a wind of ± 25 kt throughout the turn; and
- (c) 20° average achieved bank angle or the bank angle producing a turn rate of 3° per second, whichever is the lesser bank angle, and
- (d) $ISA + 15^\circ$.

4.22.3 The radii are:

- (a) Category A — 1.68 NM (3111 m);
- (b) Category B — 2.66 NM (4926 m);
- (c) Category C — 4.2 NM (7778 m);
- (d) Category D — 5.28 NM (9779 m).

Figure ENR 1.5-7
Visual Manoeuvring (Circling Approach) Area



4.22.4 For aerodromes with elevations above 1000 ft, the circling area will be larger but not specified on the instrument approach chart.

4.22.5 Where terrain or obstacles impose a circling MDA that is impractical, a maximum speed restriction may be imposed to reduce the size of the circling area in order to eliminate the terrain or obstacles from the circling area. In such cases the instrument approach chart will contain a note specifying the maximum speed for the circling area along with a note specifying the reduced radius of the particular circling area. (e.g. CAT C circling max IAS 160 kt — circling area radius 3.5 NM).

4.22.6 Where prominent terrain or obstacles within the circling area prevent visual circling the sector in which the terrain or obstacles are located may be eliminated from the visual circling area. Sectors which have been eliminated from the visual circling area are annotated "No Circling". Visual circling is prohibited in "No Circling" sectors.

4.22.7 At a controlled aerodrome, when MET conditions are equal to or better than circling minima for the aircraft category, aerodrome control may issue instructions to an aircraft on a circling instrument approach to integrate with the circuit traffic. When instructions are issued before the aircraft has reached visual reference, the phrase "WHEN VISUAL" will prefix the instructions. These instructions may include information on other aircraft in the traffic circuit.

4.22.8 At a controlled aerodrome, pilots on a circling instrument approach should report visual reference as soon as practicable.

4.23 Visual Approach Procedures — Controlled Airspace

4.23.1 IFR flights in controlled airspace may be cleared for a visual approach, or at selected locations IFR flights may be cleared to carry out a visual arrival procedure, provided the pilot:

- (a) specifically states "*REQUEST VISUAL APPROACH*"; and
- (b) can maintain visual reference to the terrain; and
- (c) the reported ceiling is not below the approved initial approach level for the aircraft so cleared; or
- (d) the pilot reports, at the initial approach level or at any time during the instrument approach procedure, that the meteorological conditions will permit a visual approach and that there is a reasonable assurance that the landing can be accomplished.

4.23.2 An aircraft operating under IFR and making either a visual approach or a visual arrival procedure remains an IFR flight and is subject to ATC clearances for the purpose of providing separation.

4.23.3 When cleared by ATC for a visual approach, further descent is unrestricted except when a specific restriction or requirement is included with the clearance for a visual approach, or is included in a subsequent clearance. Any altitude restriction remains in force until specifically cancelled. Unless otherwise instructed or approved, aircraft are to join final by the shortest practical means. Extension through the final approach requires ATC approval.

4.23.4 Aircraft on a visual approach or visual arrival procedure may be required to route via prominent geographical features, landmarks, visual reporting points or CTA/CTR sectors in order to achieve geographical separation. Visual Navigation Charts or an electronic equivalent should be carried.

4.23.5 ATC will advise, either specifically or via ATIS, when conditions are suitable for a visual approach:

- (a) by day only when the visibility is at least 16 km and the ceiling is at least 1000 ft above the applicable minimum radar vectoring altitude or the applicable instrument approach procedure commencement altitude;
- (b) by night only at Christchurch for RWY 11 or RWY 29 provided the visibility is at least 16 km and there is no cloud below 5000 ft.

4.23.6 A clearance to carry out a visual arrival procedure will only be offered, by day, when visual approaches are nominated as the preferred approach or when ATC advise that conditions are suitable for a visual approach. When cleared for a visual arrival procedure, pilots are to comply with the tracking, minimum altitude, and distance requirements of the procedure, except that ATC may amend the altitude requirements on an individual basis.

4.23.7 If visual reference to terrain is established before completion of an instrument approach procedure, the entire procedure must nevertheless be executed unless the pilot requests and is cleared for a visual approach.

4.23.8 For a visual approach at night, it is essential that the pilot has the runway lights in sight. Sighting only of the aerodrome beacon, REIL or approach lights is insufficient.

4.23.9 At Queenstown the current published non-precision approach procedures are designed to enable aircraft to establish sufficient visual references for transition from the instrument flight procedure to a visual circuit. These approaches do not utilise the standard circling areas or standard circling manoeuvring.

4.23.10 ATC approach clearance will include instructions for manoeuvring once visual. Aircraft can expect to be cleared to join the visual circuit as promulgated in AIPNZ Queenstown Aerodrome (3) page (NZQN AD 2-51.3).

4.23.11 All aircraft using any of the published non-precision approaches are expected to inform Queenstown ATC when they establish visual reference prior to reaching the missed approach point (MAPt). Aircraft may also request a visual approach.

4.23.12 ATC will protect the missed approach in accordance with paragraph 4.20 except for the following differences specific to Queenstown:

- (a) For piston, turboprop and jet aircraft, when the weather conditions are equal to or better than ceiling 5000 ft AMSL and visibility 10 km, unless otherwise requested and authorised by ATC, flights that have been cleared for a visual approach, or cleared to join the visual circuit, are expected to remain in the visual circuit in the event of not being able to land.
- (b) For piston, turboprop and jet aircraft, when the weather conditions are below or less than ceiling 5000 ft AMSL and visibility 10 km, protection of the missed approach will continue to be applied while the aircraft is manoeuvring visually from the instrument approach until the aircraft has landed.

4.24 Visual Segment Surface (VSS)

4.24.1 A surface applicable to instrument approach procedures with straight-in minima only. Its purpose is to protect the visual component of an instrument flight from the point where the obstacle clearance height is reached until landing.

4.24.2 VSS originates at a point 60 m from the landing threshold, at threshold height, has a slope 1.12° below the promulgated approach angle, and ends where the surface reaches the MDA or DA.

4.24.3 Obstacles less than 15 m above the threshold are ignored; higher obstacles penetrating the VSS are to be removed or require an aeronautical study, which may result in an increased approach angle, displaced threshold, or other acceptable mitigating action.

4.25 Visual Approach — Uncontrolled Airspace

4.25.1 Pilots in uncontrolled airspace may carry out a visual approach provided the pilot:

- (a) can maintain visual reference to the terrain; and
- (b) the ceiling is not below the initial approach level; or
- (c) the pilot has reasonable assurance at the initial approach level or at any time during the instrument approach procedure that the meteorological conditions will permit a visual approach and landing to be accomplished.

4.25.2 For a visual approach at night, it is essential that the pilot has the runway lights in sight. Sighting only of the aerodrome beacon, REIL or approach lights is insufficient.

4.26 Unattended Aerodromes — QNH Source

4.26.1 The MDA for an instrument approach is calculated on the assumption that QNH is available for that location from a CAR Part 174 certificated source. To reflect this, instrument approach charts with certificated QNH sources are annotated with the QNH instruction:

“Use (LOCAL) QNH”.

4.26.2 At locations where a certificated QNH source is not available the remote QNH procedure below is to be used. In these cases, the instrument approach charts are annotated with the QNH instruction:

“Use Remote QNH”.

Use of Remote QNH

4.26.3 If an accurate QNH is not available from an unattended aerodrome, the QNH from another aerodrome may be used, but a correction must be made to the promulgated MDA as follows:

- (a) Add 5 ft to the MDA for every 1 NM in excess of 5 NM from the source of the QNH.

Example: For an instrument approach to Great Barrier using Whitianga QNH, add 160 ft to MDA.

(Great Barrier to Whitianga = 37 NM; therefore $37 \text{ NM} - 5 = 32 \times 5 = 160 \text{ ft}$)

When Use of Remote QNH is Not Authorised

4.26.4 At some aerodromes, because of the non-homogeneous nature of weather conditions in mountainous terrain, a remote QNH setting must not be used for determining MDA or DA. At these locations, if the local QNH is not available, the approach **cannot** be used. At such aerodromes the QNH instructions will state:

“Use (LOCAL) QNH only”.

4.26.5 Remote QNH is not to be used when flying RNP (AR) approaches. If the local QNH is not available, the approach cannot be used. On such approaches the QNH instructions will state:

“Use (LOCAL) QNH only”.

4.26.6 Remote QNH is not to be used when flying RNP approaches with barometric vertical path guidance (Baro-VNAV), that is to LNAV/VNAV minima. The LNAV/VNAV minima entry will be annotated:

“Use of remote QNH NA”.

4.27 IFR Alternate Aerodrome Minima

4.27.1 CAR 91.405 prescribes IFR alternate aerodrome requirements.

4.27.2 In accordance with CAR 91.405 an aerodrome must not be listed as an alternate aerodrome unless the weather forecast at the time of submitting the flight plan indicates that, at the estimated time of arrival, the ceiling and visibility at that aerodrome will be at or above the following weather minima:

- (a) For a precision approach procedure, ceiling of 600 ft or 200 ft above DA/DH, whichever is the higher, and visibility of 3000 m or 1000 m more than the prescribed minimum, whichever is the greater.
- (b) For a non-precision approach procedure, ceiling of 800 ft or 200 ft above MDA, whichever is the higher, and visibility of 4000 m or 1500 m more than the prescribed minimum, whichever is the greater.
- (c) If no instrument approach procedure is published for the alternate aerodrome, the ceiling and visibility minima prescribed under CAR Part 91 Subpart D for an air operation under VFR, for descent below the minimum altitude for IFR flight prescribed under CAR 91.423.

4.27.3 ENR Table 1.5-7 provides a quick reference guide to alternate minima at some aerodromes using the requirements in CAR 91.405. This table is not a comprehensive list and does not preclude the use of an aerodrome not on the list using the requirements in CAR 91.405. The table uses the highest of the instrument approach procedure minima for that aerodrome. Lower alternate minima for a specific instrument approach may be derived using the requirements in CAR 91.405 (b) (2) and (3).

Table ENR 1.5-7
IFR Alternate Aerodrome Minima

Notes:

1. Height in feet above aerodrome.
2. RNP procedures are not included.

APPROACH		ILS/DME	Non-Precision (Conventional)			
			Aircraft Category			
		All Categories	A	B	C	D
Auckland		600 – 3000	800 – 4000			
Christchurch		600 – 3000	800 – 4000			
Dunedin	With DME	600 – 3000	1300 – 7			
	No DME		1600 – 7		NA	
Gisborne	With DME	---	800 – 4000			NA
	No DME		800 – 4000	1100 – 4300	1100 – 6	
Hamilton		---	900 – 4000	900 – 4300	900 – 6	900 – 7
Hokitika	With DME	---	800 – 4000		800 – 4700	NA
	No DME		900 – 4300		1000 – 6	
Invercargill	With DME	---	800 – 4000			
	No DME		1100 – 4100		1100 – 6	
Kaitiaia	With DME	---	900 – 4300		1200 – 6	NA
	No DME		900 – 7		1200 – 7	NA
Napier	With DME	---	800 – 4000			NA
	No DME		900 – 4000	1300 – 4300	1700 – 6	
Nelson		---	900 – 4000	900 – 4300	1000 – 6	NA
New Plymouth	With DME	---	800 – 4000			NA
	No DME		1100 – 4500		1100 – 7	
Palmerston Nth	With DME	---	800 – 4000		800 – 4300	
	No DME		800 – 4000	900 – 4300	1200 – 6	1200 – 7
Queenstown		Day only	---	3500 – 7		
Rotorua		---	1000 – 4100	1200 – 4300	1600 – 6	NA
Taupo		---	1000 – 4000	1000 – 4300	1100 – 6	NA
Tauranga	With DME	---	800 – 4000		800 – 4300	
	No DME		800 – 4000	1000 – 4300	1700 – 6	NA
Timaru		---	900 – 4000	900 – 4300	1100 – 6	NA
Wellington		700 – 3400	1100 – 7			
Westport		---	800 – 4000	800 – 4300	900 – 6	NA
Whakatane	With DME	---	800 – 4000	800 – 4300	1100 – 6	NA
	No DME		1200 – 5		1200 – 7	

APPROACH	ILS/DME	Non-Precision (Conventional)			
		Aircraft Category			
	All Categories	A	B	C	D
Whanganui With DME No DME	---	900 – 4000	900 – 4300	1200 – 6	NA
		1300 – 6		1300 – 7	
Whangarei	---	800 – 4000	800 – 4300	NA	
Woodbourne	---	900 – 4000	900 – 4300	1000 – 6	NA

4.28 IFR Arrival Procedures — Unattended Aerodromes

4.28.1 Pilots carrying out an instrument approach at an aerodrome that is unattended are required to follow the RTF procedures for unattended aerodromes.

4.28.2 Refer also to “AD 1.6-3 Circuit Joining Procedures” for unattended aerodromes, as these are applicable to both VFR and IFR traffic.

4.28.3 It is important that the minimum altitude is not infringed and flight to the aerodrome is not continued unless the pilot is satisfied that integration with circuit traffic operating in flight visibilities down to 1500 m can be achieved. Where a traffic conflict is likely, descent in IMC should be restricted to 1200 ft above aerodrome elevation.

4.28.4 When a non-DME instrument approach is being carried out at an uncontrolled aerodrome, MDA should be attained as soon as possible after the end of base turn, as VFR aircraft may be operating close to the cloud base in the vicinity of the aerodrome and approach aid.

4.28.5 The “Arrival/Departure” procedures specified in AD 2.24 are applicable to the routes and locations stated unless otherwise authorised by ATC. They are in addition to those procedures portrayed on ENRC, ARC, instrument approach and SID charts.

4.28.6 Pilots of aircraft operating on an IFR flight plan and executing an instrument approach as described above, are reminded that in terminating the instrument approach for landing they are initiating visual flight in uncontrolled airspace and the rules applicable to such operations apply.

4.29 RNP/Baro-VNAV Approach Procedures

4.29.1 LNAV/VNAV minima will be shown only in cases where the procedure has been evaluated using PANS-OPS Baro-VNAV criteria.

4.29.2 Use of LNAV/VNAV minima is authorised only if the aircraft is equipped with an approved navigation system which presents to the pilot computed vertical guidance referenced to the promulgated vertical path angle (VPA).

4.29.3 Use of LNAV/VNAV minima is not authorised using remote QNH.

4.29.4 Published LNAV/VNAV minima will always include a note in the minima box regarding the applicable minimum temperature to which the use of the minima is authorised. If aerodrome temperature drops below the published minimum, LNAV minima shall apply.

4.29.5 RNP (AR) approaches are procedures with vertical guidance and require VNAV guidance systems. RNP (AR) approaches require special authorisation and are only available to approved operators.

4.29.6 Use of RNP (AR) minima is not authorised using remote QNH.

4.29.7 Published RNP (AR) minima will always include a note regarding the applicable minimum and maximum temperatures to which the approach can be used. If the aerodrome temperature is outside the published range, the approach cannot be used.

